AD/A-007 036

A HUMAN VOLUNTEER SCREENING QUESTIONNAIRE: DEVELOPMENT AND APPLICATION

Russell A. Bemel, et al

School of Aerospace Medicine
Brooks Air Force Base, Texas

February 1975

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

AD/A-007038

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: SAM-TR-75-5	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle): A HUMAN VOLUNTEER SCREENING QUESTIONNAIRE: DEVELOPMENT AND APPLICATION	5. TYPE OF REPORT & PERIOD COVERED: Final, September 1973-December 1974
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Russell A. Benel, Sergeant, USAF; William F. Storm, Ph.D.	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS: USAF School of Aerospace Medicine (VNE), Aerospace Medical Division (AFSC), Brooks Air Force Base, Texas 78235	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 62202F, 7930-09-04
11. CONTROLLING OFFICE NAME AND ADDRESS: USAF School of Aerospace Medicine (VNE), Aerospace Medical Division (AFSC), Brooks Air Force Base, Texas 78235	12. REPORT DATE: February 1975
	13. NUMBER OF PAGES: 14
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report): UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Subject selection
Personality
Human Volunteer Screening Questionnaire

20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A human volunteer screening questionnaire (SAM Form 70) was developed and subsequently applied. Suggestions for use in the context of screening groups of basic trainees from Lackland AFB, Texas, are presented, with a detailed discussion of a suitable interview technique. Typical volunteers selected through the outlined procedure are described. Personality profiles derived from the EPPS to four reference groups (AF pilots, Naval pilots, unselected basic trainees, and a college normative sample) are compared. Possible limiting factors in generalizing from a selected group to various other populations are noted.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

NOTICES

This final report was submitted by personnel of the Environmental Physiology Branch, Environmental Sciences Division, USAF School of Aerospace Medicine, Aerospace Medical Division, AFSC, Brooks Air Force Base, Texas, under job order 7930-09-04.

When U.S. Government drawings, specifications, or other data are used for any purpose other than a definitely related Government procurement operation, the Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

This report has been reviewed by the Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

RUSSELL A. BENKEL, Sergeant, USAF
Project Scientist

WILLIAM F. STORM, Ph.D.
Project Scientist/Supervisor

EVAN R. COLLINS, Colonel, USAF, MC
Commander

[illegible] for	
NTIS	White Section ☐
DTIC	Buff Section ☐
[illegible]	☐
JUSTIFICATION	
BY	
DISTRIBUTION/AVAILABILITY CODES	
Dist.	AVAIL. and/or SPECIAL
A	

A HUMAN VOLUNTEER SCREENING QUESTIONNAIRE: DEVELOPMENT AND APPLICATION

INTRODUCTION

Human volunteers are often employed for performance testing under various conditions within the Environmental Physiology Branch of the Environmental Sciences Division, USAF School of Aerospace Medicine. The extended course of many studies precludes the use of "in-house" volunteers. In this situation human volunteers are solicited from the basic training facility at Lackland AFB, Texas, for participation in these experiments upon their completion of basic training. The scope of this paper does not include delineation of the administrative details and channels to be followed for procurement of human volunteers, but does show the development and subsequent application of a screening questionnaire with recommendation for future applications. A general outline of the screening process will be presented noting the function of the questionnaire.

SELECTION PROCEDURE

The typical procedure for selection of human volunteers involves arranging to interview Lackland AFB training flights (45-50 basic trainees) each evening for three to five nights depending on the number of volunteers needed. While the size of each flight seems large, recently only 30% of each flight have been eligible to volunteer. The remainder of each flight, having entered the Air Force under various programs guaranteeing job preferences, must meet certain deadlines for completion of basic training and entrance into technical school. Once the eligible basic trainees have been seated in a suitable room, we have found it advantageous to describe who we are and the purpose of our visit. A thorough, nontechnical explanation of the purpose of the planned experiment and the requirements which selected volunteers must fulfill as part of the protocol should serve to identify those who are genuinely interested. Various audiovisual aids have been found to be particularly helpful, including slides of the particular experimental apparatus to be used. Listing potential benefits and/or hazards which may result from participation in the planned experiment should be an integral part of any introductory remarks. A question and answer period following these introductory remarks has proven useful in removing any remaining ambiguities. At this point, those trainees who are not at all interested are asked to return to their flight. The screening questionnaires are now distributed. We have found it beneficial to have one member of the investigator's team available to answer questions concerning completion of the questionnaire, while another arranges an area to be used for personal interviews. During this time a slide of the questionnaire may be projected to facilitate completion. While each of the remaining potential volunteers is being individually interviewed by one or two of the investigators, the remaining investigators should be available to interact with those potential volunteers waiting to be

interviewed. While the interview may be the primary factor in selection, valuable additional screening information may be gained through this less formal interaction.

Beginning the interview with a review of material covered on the questionnaire has been found to be essential both from the standpoint of rapport and to insure completion of the questionnaire to the best of the interviewee's ability. Additionally, we have found that a determination of the individual's personal situation may aid in selection. Factors such as marital status (i.e., stable or unstable), health of family (including parents and siblings), and preservice commitments may affect the individual's entry into and completion of the course of the experiment. Consideration should also be given to the motivation and sincerity of the potential volunteer. Because well-motivated, sincere individuals have proven to be more reliable as volunteers, those exhibiting these characteristics should be given priority in selection when other factors are equal. Other questions, helpful in discriminating between potential volunteers, include those on reasons for entry into the service, interpersonal relations (i.e., "How do you like basic training?" or "How do members of your flight get along?"), and future plans.

At the completion of each interview, the interviewee should be informed of the date when he can expect to be contacted, if selected. We have found it best not to give a definite statement of the decision concerning an individual's selection or rejection at the time of the interview. A positive decision may not be fulfilled because of administrative problems, and a negative decision may be quite upsetting for an individual already under the considerable stress of basic training. Either decision may dramatically affect rapport with subsequent interviewees. If an individual persists in "knowing his chances," it may be helpful to restate the number of volunteers to be selected, the number of potential volunteers to be interviewed, and the careful consideration which will be given each individual. With the exception of withholding the selection decision from the interviewees, absolute candor should be maintained on the nature of the experiment, facilities (both experimental and recreational), what is required of volunteers (both on- and off-duty), and any benefits or hazards which may result from participation in the experiment.

A short break between interviews may be useful in consolidating opinions as to the suitability of the individual just interviewed, the assignment of a numerical rating, and recording any comments which may aid in selection. We have found a 5-point rating scale to be best (1 being poor and 5 being excellent). We use the ratings to quantify our subjective feelings toward an individual's suitability as a human volunteer. In our scheme, 1 means poor, definitely rejected; 2--marginal, below average; 3--average, generally suitable; 4--above average, definitely suitable; and 5--outstanding, definitely suitable and selected.

Aside from the formal interview, it has often proven valuable to have those other investigators interacting with the potential volunteers make covert or mental notes concerning their acceptability. The interaction itself promotes rapport prior to the interview, and this informal setting may reveal more typical aspects of the potential volunteers' behavior. Within the formal interview there may be a tendency for some individuals to display a lack of candor in an attempt to portray themselves in a favorable light. Large discrepancies between the formal and informal behaviors may warrant exclusion of an individual from consideration.

Before actual selection, the investigator must be cognizant of those characteristics which potential selectees should possess. Some of these characteristics may vary depending on the nature of the experiment, while others may be relatively consistent over experiments. Occasionally it has proven valuable to derive a profile of the ideal subject for a particular experiment and determine the amount of variation tolerable on the relevant variables. All interviewees may be rated against this ideal subject and those failing to match in significant areas may be downgraded and rejected without further consideration. Examples of this might include rejection of smokers if nonsmokers are required, or left-handed volunteers if only right-handed volunteers can participate. All potential selectees who have passed such cut-off criteria may profitably be divided into two groups: the first group, those definitely selected on the basis of correspondence to the ideal subject and a positive interaction during the interview (highly rated); and a second group, which might be described as alternates (moderate ratings), those who would be acceptable if needed. If a sufficient number (equal to or greater than the total required) fall in the first group, the alternates may also be rejected. If the number of those definitely selected falls short of the number needed for the experiment, we have found it profitable to rank the possible selectees from most to least desirable on the relevant variables. This ranking should take into account all possible sources of information including the formal interview and the ratings and comments derived from it, as well as any impressions drawn from the informal interaction between investigators and potential volunteers.

We have found it useful to engage in the preceding procedure immediately following each interview session. This allows decisions to be made while the information is still current and also reinforces any impressions which will be necessary for the final selection. For both the nightly and final selection procedures all investigators present should have input in any decision.

The final list which is generated through this selection procedure should include more individuals than are actually required for the experiment. The need for the extra individuals would occur if during coordination of this list through administrative channels certain selectees on the list were determined to be unavailable. After the list of names has been approved the investigator contacts each selectee to insure that the

individual has remained interested and still wishes to be a human volunteer. If an individual is no longer interested in volunteering, a volunteer would be selected from the list of extra individuals. Once the list of those selected has been reconciled with those still desiring to volunteer, the list should be sent through administrative channels to insure proper assignment of those selected.

HUMAN VOLUNTEER SCREENING QUESTIONNAIRE

The current Human Volunteer Screening Questionnaire (SAM Form 70, Appendix A) was partially based on an earlier typewritten form (Appendix B). The earlier form sought to objectify the selection procedure and provide the investigator with some basic information which would serve to identify the interviewee for selection procedures. The current form attempts to fulfill the functions of the previous form as well as providing more in-depth information. Much of the information is biographical in nature, but some concerns areas which might interact significantly with experimental requirements.

The first four lines of the form were designed to provide identifying data (i.e., Name, SSAN, date of birth, age, and squadron and flight) and to provide information with which the interviewer may work to develop rapport (i.e., marital status, siblings, and hometown). The next four sections concerning education, career field, AQE scores, and technical school should suggest the level of intellectual functioning as well as motivational information. Discussion of information contained in these sections may elicit information which will affect the selection procedure (i.e., expulsion from school or low AQE scores), as well as be indicative of the motivational level of the interviewee and how realistic the individual is in his career motivation. The importance of the remaining questions on the form will depend primarily on the nature of the particular variables under investigation as well as the particular apparatus and environments. The amount smoked might be a factor to be controlled or alternatively smokers might be excluded. The motor abilities discussed could be important factors in selection. Flight and/or driving experience or the lack thereof might interact with performance on certain apparatus (i.e., Link GAT-1, Complex Coordinator, or other flight-oriented tasks). Typing and musical experience might interact with performance on tasks of manual dexterity, especially those involving a keyboard-style subject console. Handedness could be a selection factor for certain apparatus. A questionable background in the section on health factors could be a negative indicator on those studies involving hazardous duty. Previous experience with apparatus similar to that being used in the current investigation might also be a factor. The last section, in addition to eliciting the information requested, may allow the interviewer to determine the ability of the interviewee to entertain himself. This point may be of particular importance in experimental designs in which the volunteers are allowed considerable unsupervised free time. Although the form was intended to be extensive, it may lack information relevant to a particular investigator's needs. The bottom space was provided to fulfill this function

and to allow the interviewer space for comments. We have found that comments are helpful for selection and recommend that the interviewer do so, but it is best to restrict these comments from the interviewee for purposes of rapport.

TYPICAL HUMAN VOLUNTEER

A total of 41 human volunteers have been selected using both the typewritten prototype and the printed form. Of these, the first 14 had completed the earlier typewritten form and the 27 latter subjects, the printed form. Additional information on these human volunteers was collected from medical records as well as from the Edwards Personal Preference Schedule, a personality inventory (1).

The typical selectee was a single (95%), right-handed (80%), high school graduate (98%), experienced in automotive driving (100%), and able to type (76%) an average of 32 words per minute. Physically the selectees had a mean height of 70.3 in. and weight of 160.2 lb. with a modal physical profile of P1, U1, L1, H1, E1, S1 as derived from Standard Form 88, block 76. Only 37% were smokers. While 39% of the selectees had some college, their average length of enrollment in college was less than 1 year. An additional 10% of the selectees had trade or technical school experience, averaging slightly over 1 year in attendance. The mean AQE scores for the 27 latter selectees, who filled out SAM Form 70, were General 80.5, Administrative 64.3, Mechanical 81.5, and Electronics 84.2. The majority (59%) of the selectees were enlisted in the Electronics career field with 22% in the General, 10% in the Mechanical, and 9% in the Administrative career fields. The age of selectees ranged from 18 to 24 years with a mean of 19.5. The 41 selectees represented 20 different states, Puerto Rico, and two foreign countries (Canada and England). The latter 27 selectees had a median family size of 2.7; 11 were first born (1 only child), and 5 were last born (family size two or greater). Of the 29% who had musical experience, 42% played piano, 33% guitar, and the remainder covered a diverse selection of instruments. Nearly all of the selectees had involvement in athletics, but the extent and level of competition were not quantified.

As part of the investigatory procedure all subjects were administered the Edwards Personal Preference Schedule, which provides measures of 15 personality variables, briefly described by Peterson et al. (4) as follows:

1. Achievement (Ach): To do one's best, to be successful, to accomplish tasks requiring skill and effort.

2. Deference (Def): To get suggestions from others, to find out what others think, to follow instructions and do what is expected.

3. Order (Ord): To have written work neat and organized, to make plans before starting on a difficult task, to have things organized.

4. Exhibition (Exh): To say witty and clever things, to tell amusing jokes and stories, to talk about personal adventures and experiences.

5. Autonomy (Aut): To be able to come and go as desired, to say what one thinks about things, to be independent of others in making decisions.

6. Affiliation (Aff): To be loyal friends, to participate in friendly groups, to do things for friends, to form new friendships.

7. Intraception (Int): To analyze one's motives and feelings, to observe others, to understand how others feel about problems, to analyze the behavior of others.

8. Succorance (Suc): To have others provide help when in trouble, to seek encouragement from others, to have others be sympathetic and understanding about personal problems.

9. Dominance (Dom): To argue for one's point of view, to be regarded by others as a leader.

10. Abasement (Aba): To feel guilty when one does something wrong, to accept blame when things do not go right, to feel the need for punishment for wrong doing.

11. Nurturance (Nur): To help friends when they are in trouble, to assist others less fortunate, to treat others with kindness and sympathy.

12. Change (Chg): To do new and different things, to travel, to meet new people.

13. Endurance (End): To keep at a job until it is finished, to complete any job undertaken, to work hard at a task.

14. Heterosexuality (Het): To go out with members of the opposite sex, to engage in social activities with the opposite sex.

15. Aggression (Agg): To attack contrary points of view, to criticize others publicly, to blame others when things go wrong.

The mean scores of our typical human volunteer (SAM volunteers) are presented in Table 1. For purposes of comparison the scores of three other military groups and the norms for college students are also presented. While certain similarities are apparent among the groups, there is not a one-to-one correspondence. To determine the degree of similarity between these groups, Pearson Product-Moment Correlations (r) were computed yielding the intercorrelations presented in Table 2. As might have been suspected, the two pilot groups correlated most highly with each other. An unexpected finding was the higher correlations of the unselected group of basic trainees studied by French (3) with the two samples of pilots as compared to our selected group. However, the differences between the correlations were not significant. In retrospect, several factors may have influenced this difference. Our sample was not selected from the entire population of basic trainees, rather from the basic trainees available, i.e., not guaranteed a job. The effect this had on the population available for selection has not been empirically determined; however, one might suppose these currently available basic trainees to be unrepresentative of the overall population of basic trainees. If the total population of basic trainees had been available for selection, it is possible that our sample would have more nearly resembled French's and have correlated more highly with the pilot groups. The limited availability of basic trainees was not the only factor affecting these correlations. The factors on which selection was based might also have operated to lower correlations. Selection was based partially on the estimated tractability of the potential volunteer. This might have led to the lower mean scores on the EPPS variables of Dom and Ord, while yielding higher mean scores on Aff and Nur. On these four variables the volunteers and pilots were on opposite sides of the means from the EPPS norms. Additionally, French's basic trainees differed in this same direction from the SAM volunteers with the magnitude of difference being slightly smaller than that of the pilot groups. It appears that the volunteers are sufficiently similar in age, physical profile, and personality profile to both the general population and such specific populations as that of the pilots. However, it should be noted that neither these nor any other volunteers constitute a random sample.

CONCLUSIONS

We have found the use of a standardized form to aid in selection of human volunteers. The form serves to organize data about each potential volunteer in a manner adaptable to the needs of various investigators. Use of the screening form has proven to allow selection decisions to be made on the basis of objective, quantifiable data, as well as intuitive judgment of the investigator. Combination of the form with the interview and selection procedures previously outlined has led to the selection of subjects who, while amenable to experimental procedures, resemble pilot reference groups sufficiently to allow results to be generalized. Correlations between the EPPS profiles of selected volunteers and both USAF pilots and successful Naval aviation cadets were positive. Through selection more directly aimed at deriving a volunteer group similar to a particular reference group, even higher correlations might be obtained.

TABLE 1. EPPS MEANS FOR VARIOUS GROUPS

EPPS variables	SAM volunteers	Basic trainees[a]	Naval aviat. cadets[b]	USAF pilots[c]	EPPS norms[d]
1. Ach	14.0	14.88	16.7	17	15.56
2. Def	10.2	13.07	12.5	13	11.21
3. Ord	8.3	13.46	11.9	12	10.23
4. Exh	12.6	13.05	14.3	13	14.40
5. Aut	14.1	11.69	11.7	12	14.34
6. Aff	15.6	14.58	12.2	12	15.00
7. Int	14.6	15.01	15.4	16	16.12
8. Suc	10.5	9.67	7.7	8	10.74
9. Dom	13.8	14.88	19.9	20	17.44
10. Aba	14.2	16.42	12.1	11	12.24
11. Nur	16.2	14.35	11.0	11	14.04
12. Chg	18.5	15.90	18.2	17	15.51
13. End	13.2	15.97	16.6	18	12.66
14. Het	18.5	15.58	17.0	13	17.65
15. Agg	12.4	11.28	12.3	11	12.79

[a]French, 1958 (standard instruction group at completion of basic training).

[b]Peterson, Lane, and Kennedy, 1965 (successful cadets).

[c]Fine and Hartman, 1968.

[d]Edwards, 1959 (college student norms).

TABLE 2. INTERCORRELATIONS BETWEEN VARIOUS GROUPS ON THE EPPS

		2	3	4	5
1.	SAM volunteers	.57[b]	.48[a]	.28	.78[c]
2.	Basic trainees		.68[c]	.61[b]	.48[a]
3.	Naval aviat. cadets			.92[c]	.73[c]
4.	USAF pilots				.58[b]
5.	EPPS norms				

[a] $p < .10$
[b] $p < .05$
[c] $r < .01$

REFERENCES

1. Edwards, A. L. Edwards Personal Preference Schedule: Manual. New York: Psychological Corp., 1959.

2. Fine, P. M., and B. O. Hartman. Psychiatric strengths and weaknesses of typical Air Force pilots. SAM-TR-68-121, Nov 1968.

3. French, E. G. A note on the use of the Edwards Personal Preference Schedule for use with basic airmen. Educational and Psychological Measurement 18:109-115 (1958).

4. Peterson, F. E., N. E. Lane, and R. S. Kennedy. The relationship of the Edwards Personal Preference Schedule to success in Naval flight training. NAMI Report No. 45, Oct 1965.

APPENDIX A

HUMAN VOLUNTEER SCREENING QUESTIONNAIRE

NAME (Last, First, MI)			SSAN
DATE OF BIRTH	AGE	MARITAL STATUS ☐ MARRIED ☐ NEVER MARRIED ☐ DIVORCED ☐ ENGAGED ☐ OTHER	
NUMBER OF BROTHERS AND SISTERS OLDER: MALE _____ FEMALE _____ YOUNGER: MALE _____ FEMALE _____			
SQUADRON	FLIGHT	PRESENT HOMETOWN (City, State)	
EDUCATION YEARS OF HIGH SCHOOL _____ DIPLOMA _____ MAJOR _____ YEARS OF COLLEGE _____ DEGREE _____ MAJOR _____ NAME OF COLLEGE AND LOCATION _____ YEARS OF TRADE OR TECHNICAL SCHOOL _____ FIELD _____			
CAREER FIELD ENLISTED UNDER	AQE SCORES (If Known) GENERAL _____ ADMIN _____ MECH _____ ELECT _____		
AIR FORCE TECHNICAL SCHOOL DESIRED			
DO YOU SMOKE? ☐ YES ☐ NO AMOUNT SMOKED PER DAY _____			
EXPERIENCE WITH FLIGHT SIMULATORS ☐ YES ☐ NO	TYPE	HOURS	
DO YOU FLY? ☐ YES ☐ NO	AIRCRAFT TYPE	HOURS	
DO YOU DRIVE? ☐ YES ☐ NO	STICKSHIFT ☐ YES ☐ NO	HOW MANY YEARS?	
DO YOU TYPE? ☐ YES ☐ NO	WORDS PER MINUTE	☐ MANUAL ☐ ELECTRIC	
DO YOU PLAY A MUSICAL INSTRUMENT? ☐ YES ☐ NO	INSTRUMENT	YEARS	
ARE YOU RIGHT OR LEFTHANDED? ☐ RIGHTHANDED ☐ LEFTHANDED			
BRIEFLY NOTE MAJOR DISEASES OR ILLNESSES			
DESCRIBE ANY PREVIOUS EXPERIENCES WITH PSYCHOMOTOR AND/OR PSYCHOLOGICAL TESTING			
BRIEFLY NOTE ANY OTHER TRADES, ABILITIES, OR SKILLS (Including Athletics)			
DO NOT WRITE IN THIS SPACE			

Preceding page blank

APPENDIX B

EARLIER TYPEWRITTEN FORM QUESTIONNAIRE

NAME: SEAN:

AGE: MARITAL STATUS:

SQD: FLIGHT:

PRESENT HOMETOWN:

EDUCATION:

Years of High School _____ Diploma? _____

Years of College _____ Diploma? _____ Major _____

Years of Trade or Technical School _____ Field _____

BRIEFLY NOTE MAJOR DISEASES OR SURGERY:

CAREER FIELD ENLISTED UNDER _____

AF TECHNICAL SCHOOL DESIRED _____

DO YOU SMOKE? _____ HOW MUCH/DAY _____

DO YOU HAVE ANY EXPERIENCE WITH FLIGHT SIMULATORS? _____ HOURS _____

DO YOU FLY? _____ AIRCRAFT TYPE? _____ HOURS _____

DO YOU DRIVE? _____ HOW MANY YEARS? _____ MILES/YR _____

DO YOU TYPE? _____ WORDS/MIN _____

DESCRIBE ANY PREVIOUS EXPERIENCE WITH PSYCHOMOTOR AND/OR PSYCHOLOGICAL TESTING:

BRIEFLY NOTE ANY OTHER TRADES, ABILITIES, OR SKILLS: